

**IN THE ABSTRACT**

Please delete the present abstract in its entirety and replace it with the following:

There is provided a system for pumping thermal energy. The system includes (a) a heater for heating a liquid, (b) a gas-liquid contactor for adding vapor from the liquid to a process gas to produce a vapor-containing gas, and (c) a membrane permeator for removing the vapor from the vapor-containing gas and for providing a resultant vapor. The system transfers a quantity of thermal energy from the heater to the resultant vapor.